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IS 10268 (1982) : Specification for Chlorfenvinphos,
Technical [FAD 1: Pesticides and Pesticides Residue
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Bhartṛhari—Nītiśatakam

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Indian Standard
SPECIFICATION FOR
CHLORFENVINPHOS, TECHNICAL

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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Indian Standard

SPECIFICATION FOR CHLORFENVINPHOS, TECHNICAL

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Indian Standard

SPECIFICATION FOR CHLORFENVINPHOS, TECHNICAL

O. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 30 August 1982, after the draft finalized by the Pest Control Sectional Committee had been approved by the Agricultural and Food Products Division Council and the Chemical Division Council.

0.2 Chlорfenvinphos, technical is used in the preparation of formulations required for the control of agricultural pests.

0.3 Chlорfenvinphos is accepted common name by the International Organization for Standardization (ISO) for 2-chloro-1-(2, 4-dichlorophenyl) vinyl diethyl phosphate. The empirical and structural formulae and the molecular mass of chlорfenvinphos are indicated below:

Empirical Formula	Structural Formula	Molecular Mass
$C_12H_{14}Cl_3O_4P$	$C_2H_5O^-$	359.5

0.4 In the preparation of this standard due consideration has been given to the provisions of the **Insecticides Act**, 1968 and the Rules framed thereunder. However, this standard is subject to the restrictions imposed under these, wherever applicable.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

*Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard prescribes the requirements and the methods of sampling and test for chlorfenvinphos, technical employed in the preparation of insecticidal formulations.

2. REQUIREMENTS

2.1 Description-The material shall be an amber **coloured** liquid, free from extraneous material and added modifying agents.

2.2 The material shall also comply with the requirements as specified in Table 1.

TABLE 1 REQUIREMENTS FOR CHLORFENVINPHOS, TECHNICAL

SL No.	CHARACTERISTIC	REQUIREMENT	METHOD OF TEST, REF TO	
(1)	(2)	(3)	(4)	(5)
i)	Chlorfenvinphos content, percent by mass, <i>Min</i>	92	A	—
ii)	Moisture content, percent by mass, <i>Max</i>	0·5	—	4.1
iii)	Acidity (as H_2SO_4), percent by mass, <i>MUX</i>	0·7	—	11.3.2
iv)	Relative density at 15°C/15°C	1·30 to 1.39	—	5

*Methods of tests for **pesticides** and their formulations (first *revision*).

3. PACKING AND MARKING

3.1 Packing -The material shall be packed in HDPE drums of 1·75 to 2·25 mm thickness. The HDPE drums shall be repacked in mild steel drums with removable lid and having bolt type closing ring. For packs of 5 litres HDPE containers conforming to IS :6312-1971* shall be used. The containers shall also comply with the general requirements as specified in 2 of IS: 8190 (Part II)-1980†.

*Polyethylene containers for transporting liquids (5 litres and above).

†Requirements for packing of pesticides: Part II Liquid pesticides (*first revision*).

3.2 Marking — The containers shall bear legibly and indelibly the following information and other additional information as required under the **Insecticides Act** and Rules.

- a) Name of the material,
- b) Name of the manufacturer,
- c) Date of manufacture,
- d) Batch number,
- e) Net mass of contents,
- f) Chlорfenvinphos content, percent (**m/m**); and
- g) The cautionary notice as worded in the **Insecticides Act** and Rules.

3.2.1 The containers may also be marked with ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

4. SAMPLING

4.1 Representative samples of the material shall be drawn as prescribed in “Indian Standard Methods for sampling of pesticides and their formulations (**under preparation**)”.

NOTE — Till such time the standard under preparation is published, samples shall be drawn as agreed to between the concerned parties.

5. TESTS

5.1 Tests shall be carried out as prescribed in the appropriate appendix and clauses as specified in col 4 and 5 of Table 1.

5.2 Quality of Reagents — Unless specified otherwise, pure chemicals and distilled water (see IS: 1070-1977*) shall be employed in the tests.

NOTE — ‘Pure chemicals’ shall mean chemicals that do not contain impurities which affect the result of analysis.

*Specification for water for general laboratory use (*second revision*).

A P P E N D I X A**[*Table 1, Item (i)*]****DETERMINATION OF CHLORFENVINPHOS CONTENT****A-1. PRINCIPLE**

A-1.1 Chlorfenvinphos content is determined on a gas liquid chromatograph over OV-225, equipped with flame ionization detector and using an internal standard in a known proportion and determining the area under each peak. The percentage purity of the sample is determined by comparison of this area with that of the standard.

A-2. APPARATUS

A-2.1 Gas Liquid Chromatograph — Suitable for analysis when operated under the following suggested operating conditions with facilities for on column injection and equipped with an internal electronic integrator or equivalent.

Column

Material	Glass
Length x ID	2·0 m x 3 mm
Stationary phase	OV 225
Solid support	Chromosorb W, HP (80 to 100 mesh)

Mass Ratio

Stationary phase/support	1/19
Packing density	0·37g/ml

Detector system

Type	FID
------	-----

Temperatures

Column oven	220°C
Injection port	225°C
Detector	250°C

Carrier Gas	Nitrogen, 2·41/hr
Sample size	2-6 μ l on-column injection
Internal standard	Di-n-butylphthalate in acetone 15·0 mg/ml (Approx)

A-2.2 Microsyringe — 10 μ l syringe with a needle of sufficient length **to** introduce the sample close to the top of the column packing.

A-2.3 Syringe Adapter — or equivalent syringe for constant volume injection.

A-3. REAGENTS

A-3.1 Standard Reference Material — E and Z isomers of chlorfenvinphos, minimum 99 percent (m/m) or standard chlorfenvinphos of known E and Z isomer content.

A-3.2 Di-n-butylphthalate — minimum purity 98 percent.

A-3.3 Acetone — analytical reagent grade.

A-4. CALIBRATION

A-4.1 Temperature of Solutions — Ensure that the temperature of all the solutions used in calibration and procedure are maintained within 3°C of one another during the manipulations (making up to the mark, injection etc).

A-4.2 Internal Calibration

A-4.2.1 Prepare a solution of di-n-butylphthalate in acetone with a concentration of approximately 15·0 mg/ml. Prepare a volume of solution sufficient for the dilution of calibration solutions (see A-4.2.2) and sample solutions (see A-5.1). Check for absence of compounds co-eluting with the E and Z isomers of chlorfenvinphos.

A-4.2.2 Weigh accurately into four separate 50 ml volumetric flasks an amount of standard chlorfenvinphos (E) to obtain calibration solutions with concentrations of 0·8, 0·9, 1·0 and 1·1 mg/ml. Add by means of a pipette 10 ml of di-n-butylphthalate solution to the flask, make up to the mark with acetone and mix thoroughly.

A-4.2.3 Weigh accurately into four separate 25 ml volumetric flasks an amount of standard chlorfenvinphos (Z) to obtain calibration solutions with concentrations of 7, 8, 9 and 10 mg/ml. Add by means of a pipette 5 ml of di-n-butylphthalate solution, make up to the mark with acetone and mix thoroughly.

A-4.2.4 When using standard chlorfenvinphos as calibration standard, weigh to the nearest 0·1 mg, 0·40, 0·46, 0·54 and 0·60 g of the standard into 50 ml volumetric flasks, add by means of a pipette 10 ml of di-n-butylphthalate solution, make up to the mark with acetone and mix thoroughly.

A-4.2.5 Analyse each calibration solution at least twice following the operating instructions given in **A-2.1**. For each chromatogram use the areas of chlorfenvinphos (*E*) and (*Z*) and di-n-butylphthalate peaks obtained from the integrator. Calculate the ratio:

$$R = \frac{\text{Area of chlorfenvinphos } (E) \text{ or } (Z) \text{ peak}}{\text{Area of di-n-butylphthalate peak}}$$

and construct calibration curves relating the mean of *R* to the concentrations of chlorfenvinphos (*E*) or (*Z*) mg/ml. Calibrate daily.

A-5. PROCEDURE

A-5.1 Weigh to the nearest 0·1 mg, $0\cdot5 \pm 0\cdot02$ g of chlorfenvinphos, technical into a 50 ml volumetric flask. Add 10 ml of di-n-butylphthalate solution by pipette and make up with acetone. Mix thoroughly. Analyse the sample solutions following the operating instructions (see A-2.1). Inject each of the sample solutions at least twice.

A-6. CALCULATION

A-6.1 For each injection determine from the chromatogram the ratio:

$$R = \frac{\text{Area of chlorfenvinphos } (E) \text{ or } (Z) \text{ peak}}{\text{area of di-n-butylphthalate peak}}$$

A-6.2 Read from the calibration curve the chlorfenvinphos (*E*) or (*Z*) present in the sample solutions in mg/ml. Proceed as described in 6.3.

A-6.3 Final Calculation — Calculate for each of the sample solutions the chlorfenvinphos (*E*) or (*Z*) content by means of the following equation:

$$\text{Chlorfenvinphos } (E) \text{ or } (Z), \text{ percent } (\text{m/m}) = \frac{C \times V}{10M}$$

where

C = concentration mg/ml of chlorfenvinphos (*E*) or (*Z*) in sample solution,

V = volume of sample solution in ml, and

M = mass, in g, of sample taken for test.

A-6.4 Calculate the chlorfenvinphos (*E*) or (*Z*) content of the sample by averaging the two values obtained in 6.3.

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Base Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

<i>Quantity</i>	<i>Unit</i>	<i>Symbol</i>	<i>Definition</i>
Force	newton	N	$1 \text{ N} = 1 \text{ kg} \cdot \text{m/s}^2$
Energy	joule	J	$1 \text{ J} = 1 \text{ N.m}$
Power	watt	W	$1 \text{ W} = 1 \text{ J/s}$
Flux	weber	Wb	$1 \text{ Wb} = 1 \text{ V.s}$
Flux density	tesla	T	$1 \text{ T} = 1 \text{ Wb/m}^2$
Frequency	hertz	Hz	$1 \text{ Hz} = 1 \text{ c/s (s}^{-1}\text{)}$
Electric conductance	siemens	S	$1 \text{ S} = 1 \text{ A/V}$
Electromotive force	volt	V	$1 \text{ V} = 1 \text{ W/A}$
Pressure, stress	pascal	Pa	$1 \text{ Pa} = 1 \text{ N/m}^2$